

being able to be connected to the output shaft of the gearbox as described in the document EP-A-0 331 559, or in a variant to the input shaft of the rear axle.

[0063] The rotary electrical machine is in a variant an alternator with a liquid cooling circuit as described for example in the document FR-A-2 780 571.

[0064] This alternator can be reversible in order in particular to constitute an electric motor so as to start the thermal engine of the motor vehicle. Such an alternator is called an alternator/starter.

[0065] While the form of apparatus and methods herein described constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to this precise method and form of apparatus, and that changes may be made therein without departing from the scope of the invention, which is defined in the appended claims.

[0066] What is claimed is:

CLAIMS

1. A cooling channel or conduit length for a rotary electrical machine, the channel or conduit length comprising at least one channel or conduit placed along at least part of the machine to be cooled and having an input axis and an output axis, as well as at least one input coupling and at least one output coupling for a cooling fluid and between which said at least one channel or conduit extends, characterized in that said at least one input coupling or couplings and said at least one output coupling or couplings are each oriented at least approximately along the orientation of the corresponding input axis or output axis, respectively, of the channel or conduit and have, all along their longitudinal extents, a generally constant area of their cross section of flow.
2. The cooling channel or conduit length according to claim 1, characterized in that the channel or conduit is a helical channel or conduit having at least one turn intended to surround at least part of the machine to be cooled and having respectively an input axis and an output axis oriented along a tangential axis or plane passing through an input and output circumferential zone of the length, respectively, and said at least one input coupling and said at least one output coupling.
3. The cooling channel or conduit length according to claim 2, characterized in that said input coupling and said at least one output coupling are disposed, in an axial view of the length, with a small angular difference between the two couplings.
4. The cooling channel or conduit length according to claim 2, characterized in that said helical channel or conduit is formed by two complementary walls, an internal wall and said external wall, the external wall being formed by a cooling fluid envelope conformed so as to grant to the cooling fluid a helical path with a single turn.

5. The cooling channel or conduit length according to claim 4, characterized in that it comprises a single part joining said at least one input coupling and said at least one output coupling, these two couplings being separated from each other by a changing low wall conformed so as to give a favored flow direction to the cooling fluid.

6. The cooling channel or conduit length according to claim 1, characterized in that said cooling channel or conduit length comprises two adjacent turns with an input coupling in common and an individual output coupling for each turn.

7. The cooling channel or conduit length according to claim 1, characterized in that said cooling channel or conduit length comprises two adjacent turns with an individual input coupling each turn and a common output coupling,

8. The cooling channel or conduit length according to claim 1, characterized in that said cooling channel or conduit length comprises conduits parallel to each other and disposed in parallel around the longitudinal axis of the machine to be cooled, said at least one input coupling and said at least one output coupling being disposed coaxially with respect to the channel or conduit to which they are allocated.

9. A rotary electrical machine, characterized in that it comprises a cooling length according to claim 1.

10. The cooling channel or conduit length as recited in claim 3, wherein said small angle difference is between 20 and 30 percent.

11. A cooling channel or conduit for cooling a rotary electrical machine, the cooling channel or conduit comprising at least one channel or conduit placed along at least part of the machine to be cooled and having at least one input coupling and at least one output coupling for a cooling fluid and between which said at least one channel or

conduit extends, characterized in that said at least one input coupling or couplings and said at least one output coupling or couplings are each oriented such that a fluid enters through said at least one input at a first flow rate, into said at least one channel or conduit, and exits said at least one output at substantially a second flow rate, said first and second flow rates being generally the same.

12. The cooling channel or conduit as recited in claim 11, wherein said at least one channel or conduit comprises an input axis and an output axis, said at least one input causing fluid to enter said at least one channel or conduit along said input axis and said at least one output causing fluid to exit said at least one channel or conduit along said output axis; said input and output axes being oriented at least approximately along a tangent to a point determined by a radial line extending to a circumference of said at least one cooling channel or conduit.

13. The cooling channel or conduit as recited in claim 11, characterized in that the cooling channel or conduit is a helical channel or conduit having at least one turn intended to surround at least part of the machine to be cooled and having respectively an input axis and an output axis oriented along a tangential axis or plane passing through a input and output circumferential zone of the length, respectively, and at least one input coupling and at least one out coupling.

14. The cooling channel or conduit according to claim 13, characterized in that said input coupling and said at least one output coupling are disposed, in an axial view of the length, with a small angular difference between the two couplings.

15. The cooling channel or conduit according to claim 13, characterized in that said helical channel or conduit is formed by two complementary walls, an internal wall and said external wall, the external wall being formed by a cooling fluid envelope conformed so as to grant to the cooling fluid a helical path with a single turn.

16. The cooling channel or conduit according to claim 15, characterized in that it comprises a single part joining said at least one input coupling and said at least one output coupling, these two couplings being separated from each other by a changing low wall conformed so as to give a favored flow direction to the cooling fluid.

17. The cooling channel or conduit according to claim 11, characterized in that said cooling channel or conduit length comprises two adjacent turns with an input coupling in common and an individual output coupling for each turn.

18. The cooling channel or conduit according to claim 11, characterized in that said cooling channel or conduit length comprises two adjacent turns with an individual input coupling each turn and a common output coupling,

19. The cooling channel or conduit according to claim 11, characterized in that said cooling channel or conduit length comprises channels or conduits parallel to each other and disposed in parallel around the longitudinal axis of the machine to be cooled, said at least one input coupling and said at least one output coupling being disposed coaxially with respect to the channel or conduit to which they are allocated.

20. A rotary electrical machine, characterized in that it comprises a cooling length according to claim 11.